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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/899,107	07/06/2001	Kazuo Saito	0171-0763P	2711
2292	7590	04/06/2004	EXAMINER	
BIRCH STEWART KOLASCH & BIRCH PO BOX 747 FALLS CHURCH, VA 22040-0747			ALEJANDRO, RAYMOND	
			ART UNIT	PAPER NUMBER
			1745	

DATE MAILED: 04/06/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

AS

<b>Office Action Summary</b>	<b>Application No.</b> 09/899,107	<b>Applicant(s)</b> SAITO ET AL.	
	<b>Examiner</b> Raymond Alejandro	<b>Art Unit</b> 1745	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 15 March 2004.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-8 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-8 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 06 July 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Response to Amendment***

This office action is responsive to the amendment filed 03/15/04. The applicants have overcome the 35 USC 102 rejection because a certified translation of the foreign priority document has been submitted and thus, made of record. Refer to the abovementioned amendment for specific details on applicant's rebuttal arguments. However, upon further reconsideration the present claims are rejected again over newly discovered art as seen below and for the reasons of record. Thus, prosecution on the merits of this application is reopened for the reasons indicated below:

### ***Claim Rejections - 35 USC § 112***

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claim 7 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.
3. Claim 7 is indefinite as its preamble "The fuel cell separator as defined in claim 6" is not consistent with the preamble of claim 6 reciting "A process for producing a fuel cell separator". In this case, it is noted that dependent claim 7 depends from independent claim 6.

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### ***Double Patenting***

1. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or

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improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

2. Claims 2 and 6 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1 and 3 of copending Application No. 10/013545 (Patent Application Publication 2002/0068210). Although the conflicting claims are not identical, they are not patentably distinct from each other because of the following reasons:

The copending application's 45 claims the following (CLAIMS 1 and 3):

1. A separator for fuel cell, formed using a base material obtained from a composition comprising at least a binder, a powdery carbon filler having an average particle diameter of 10 nm to 100  $\mu$ m, and a short fiber having an average fiber length of 0.03 to 6 mm, in which composition the amount ratio of the above three components is such that the amount of the powdery carbon filler is 200 to 800 parts by weight

and the amount of the short fiber is 10 to 300 parts by weight, both per 100 parts by weight of the binder.

3. A process for producing a separator for fuel cell, which comprises mixing at least a binder, a powdery carbon filler having an average particle diameter of 10 nm to 100  $\mu$ m, and a short fiber having an average fiber length of 0.03 to 6 mm in such an amount ratio that the amount of the powdery carbon filler becomes 200 to 800 parts by weight and the amount of the short fiber becomes 10 to 300 parts by weight, both per 100 parts by weight of the binder, granulating the resulting mixture into a granular material of 0.03 to 5 mm in particle diameter, and molding the granular material into a separator shape.

*It is noted that the copending application claims satisfy the required mass amount of binding agent and carbon powder because, for instance, 200 parts by weight of powdery carbon for 100 parts by weight of the binder is substantially equivalent to 50 parts by mass of binding agent for 100 parts by mass of the conductive carbon as instantly claimed.*

*In this case, the instant application claims are broader or more generic than the copending application claims, thus, the instant application claims are anticipated by the copending application claims. Accordingly, a broad range is anticipated by a narrow range which lies within the broad limitation. In re Goodman.*

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

3. Claims 2, 4-6 and 8 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-6 of copending Application No. 09/897638 (Patent Application Publication 2002/0028368). Although the conflicting claims are not identical, they are not patentably distinct from each other because of the following reasons:

The copending application '638 claims the following (CLAIMS 1-6):

4. A fuel cell separator which is molded from the electrically conductive resinous composition defined in any of claims 1 to 3, wherein the fuel cell separator has on one side or both sides thereof grooves through which an oxidizing gas or fuel gas is supplied, the fuel cell separator also has a specific resistance not higher than 200 mΩ.cm.

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1. An electrically conductive resinous composition composed mainly of an electrically conductive carbon powder and a binding agent, wherein

said binding agent is a mixture of a thermoplastic resin and a carbodiimide compound.

2. An electrically conductive resinous composition as defined in claim 1, wherein the mixture consists of 100 parts by mass of the thermoplastic resin and 0.001-50 parts by mass of the carbodiimide.

3. An electrically conductive resinous composition as defined in claim 1 or 2, wherein the electrically conductive carbon powder is one which has a mean particle diameter of 10 to 500  $\mu\text{m}$ , and the amount of the electrically conductive carbon powder is 100-1000 parts by mass for 100 parts by mass of the thermoplastic resin.

5. A process for producing a fuel cell separator from an electrically conductive resinous composition composed mainly of an electrically conductive carbon powder and a binding agent (which is a mixture of a thermoplastic resin and a carbodiimide compound), said fuel cell separator having on one side or both sides thereof grooves through which an oxidizing gas or fuel gas is supplied, said process comprising the step of:

injection-molding a mixture of 100 parts by mass of the thermoplastic resin, 0.001-50 parts by mass of the

carbodiimide compound, and 100-1000 parts by mass of the electrically conductive carbon powder.

6. A polymer electrolyte fuel cell consisting of a plurality of unit cells connected together, each unit cell consisting of a pair of electrodes holding a polymer electrolyte membrane between them and a pair of separators holding the electrodes between them, said separator having passages molded thereon through which gas is supplied and discharged, wherein all or part of the separators in the fuel cells are those which are defined in claim 4.

*It is noted that the copending application claims satisfy the required mass amount of*

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*binding agent and carbon powder because, for instance, 200 parts by mass of carbon powder for 100 parts by mass of thermoplastic resin (the binding agent) is substantially equivalent to 50*

*parts by mass of binding agent for 100 parts by mass of the conductive carbon as instantly claimed.*

*In this case, the instant application claims are broader or more generic than the copending application claims, thus, the instant application claims are anticipated by the copending application claims. Accordingly, a broad range is anticipated by a narrow range which lies within the broad limitation. In re Goodman.*

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

#### ***Claim Rejections - 35 USC § 102***

4. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

5. Claims 2, 6 and 8 are rejected under 35 U.S.C. 102(e) as being anticipated by Saito et al US 2002/0068210.

The instant application is directed to a fuel cell separator wherein the disclosed inventive concept comprises the specific particle and composition feature.

The applied reference has common inventors with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 102(e) might be overcome either by a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not the invention "by another," or by an appropriate showing under 37 CFR 1.131.

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As to claim 2:

Saito et al disclose a separator for a fuel cell, formed using a base material obtained from a composition comprising at least a binder, and a powdery carbon filler having an average particle diameter of 10 nm to 100  $\mu\text{m}$  (ABSTRACT/ SECTION 0014), in which composition the amount ratio of the above components is such that the amount of the powdery carbon filler is 200 to 800 parts by weight per 100 parts by weight of the binder (ABSTRACT/ SECTION 0014). It is disclosed that the powdery carbon filler is a powdery carbon filler having excellent electroconductivity such as natural graphite (e.g. scaly graphite or lumpy graphite), expanded graphite, artificial graphite, mesophase carbon and the like (SECTION 0022). It is further disclosed that the particle diameter of the powdery carbon filler can be 10 nm to 100 mm (SECTION 0023). It is disclosed that it is possible to form, during the molding of the granular mixture into a separator shape, grooves for oxidant gas feeding and grooves for fuel gas feeding (SECTION 0038). *It is noted that the extreme value of 100  $\mu\text{m}$  of the average particle diameter anticipates the claimed range.*

EXAMPLES 1-14, 17-25 and 26-30 in Tables 1, 2 & 3, respectively show the use of 100 parts by mass of a binder and 290 parts by mass of a carbon filler (TABLES 1-3). *These amounts represent a mass composition comprising approximately 25.6 % of the binder and the balance of the carbon filler.*

EXAMPLE 15 in Table 2 shows the use of 100 parts by mass of a binder and 200 parts by mass of a carbon filler (TABLE 2). *These amounts represent a mass composition comprising approximately 33.3 % of the binder and the balance of the carbon filler.*

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EXAMPLE 16 in Table 2 shows the use of 100 parts by mass of a binder and 800 parts by mass of a carbon filler (TABLE 2). *These amounts represent a mass composition comprising approximately 11.1 % of the binder and the balance of the carbon filler.*

COMPARATIVE EXAMPLE 1 in Table 5 shows the use of 100 parts by mass of a binder and 358 parts by mass of a carbon material (TABLE 5). *These amounts represent a mass composition comprising approximately 21.6 % of the binder and the balance of the carbon filler.*

*It is noted that the mass compositions above satisfy the required mass amount of binding agent and carbon powder because, for instance, 25.6 %, 33.3 %, 11.1 % and 21.6 % of binder material and the balance powdery carbon is substantially equivalent to 10-50 parts by mass of binding agent for 100 parts by mass of the conductive carbon as instantly claimed. Thus, the mass composition is disclosed with sufficient specificity.*

With respect to claim 6:

Saito et al disclose a process for producing a separator for a fuel cell, which comprises mixing at least a binder and a powdery carbon filler having an average particle diameter of 10 nm to 100  $\mu$ m in such an amount ratio that the amount of the powdery carbon filler becomes 200 to 800 parts by weight per 100 parts by weight of the binder, granulating the resulting mixture and molding the granular material into a separator (SECTION 0015 & 0002). It is disclosed that the granular mixture is made into a fuel cell separator shape by using a method such as injection molding (SECTION 0035).

Regarding claim 8:

Saito et al disclose that by using the fuel cell separator of their present invention having a strength necessary for separator, there can be obtained a solid polymer type fuel cell also

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comprising a solid polymer electrolyte membrane, gas diffusion electrodes and sealing members (SECTION 0040 and 0044).

Thus, the present claims are anticipated.

***Claim Rejections - 35 USC § 103***

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

8. Claims 1, 3-5 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Saito et al US 2002/0068210 as applied to claims 2 and 6 above, and further in view of Emanuelson et al 3634569.

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Saito et al is applied, argued and incorporated herein for the reasons above. Nevertheless, Saito et al do not expressly disclose the specific particle size relationship, the graphite density and the resistivity.

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With respect to claims 1 and 4:

Emanuelson et al describe a graphite composition and a fabrication procedure for producing a plate for fuel cells (TITLE and COL 1, lines 13-25), in particular a separator plate for fuel cells (COL 2, lines 18-22) wherein the composition consists of a graphite powder sized principally in the 50 to 150 micron range with about 7 % of the graphite powder in the range below 50 microns (COL 1, lines 13-25). It is also disclosed that forming a high density graphite structure comprises preparing a mixture of, by weight, 5-25 % of a resin binder and 75-95 % sized powdered graphite (COL 2, lines 23-47/COL 3, lines 15-20).

TABLE 1 below illustrates the distribution of particle sizes wherein a broad range of 1-12 % and/or a preferred range of 3-12 % and/or an optimum value of 7 % represents particles showing a particle diameter/size of less than 50 microns. *Thus, it is apparent from TABLE 1 that carbon powder particles longer than 50  $\mu$ m and/or longer than 30  $\mu$ m occupy more than 50 % of the sectional area therein. In this respect, it can be surmised that, at least, more than 88 % (for the highest value of either the broad range or the preferred range) or 93 % (for the optimum value) of particles exhibit a particle size greater than 50 microns. Consequently, it is positively asserted that particles greater than 50 microns represents a majority and therefore, they are the main component of the graphite powder and hence must be present in both the major axis and the minor axis directions by more than 50 %.*

TABLE I.—PARTICLE WEIGHT DISTRIBUTION

Particle size distribution	Percent			
	Broad range	Preferred range	Optimum	
Microns:				25
80-160	37-76	48-68	58	
60-100	20-74	35-60	47	
50-80	10-48	20-40	30	
40-60	3-23	8-18	13	
Fines—Below 50 microns	1-12	3-12	7	30

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As for claim 5:

Emanuelson et al disclose a graphite composition comprising a resin binder (COL 2, lines 23-45). The composition exhibits the particle weight and size distribution as seen in TABLE 1 above. *Thus, the specific resistivity is an inherent property of the graphite/binder composition. Accordingly, products of identical chemical composition can not have mutually exclusive properties, and thus, the claimed property (i.e. the specific resistivity), is necessarily present in the prior art material. Moreover, since the recited separator composition material (i.e. the conductive carbon powder and the binding agent) covers a very large number of applicable materials which can be used therefor, it is also contended that a separator made of any combination of conductive carbon powder and binding agent would produce a fuel cell separator exhibiting the specific resistivity.*

On the subject of claims 3 and 7:

Emanuelson et al reveals graphite structures having a density of 1.8 g/cc (COL 1, lines 55-60) or as high as 2.0 g/cc (COL 3, lines 15-20). EXAMPLES I, II and III shows graphite structures with a variety of densities such as 2.0 g/cc, or 1.85 g/cc, or 1.89 g/cc (TABLE II: EXAMPLES I, II and III).

In view of these disclosures, it would have been obvious to one skilled in the art at the time the invention was made to use the specific particle size relationship of Emanuelson et al to make the fuel cell separator composition of Saito et al because Emanuelson et al teach this particle size distribution is important in producing graphite structures with high densities. Thus, these dense graphite structures are characterized by high strength, high conductivities and high density useful in fuel cell applications and are essential in the production of a better product in a

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competitive market. *As explained above, it is apparent from TABLE 1 that carbon powder particles longer than 50  $\mu\text{m}$  and/or longer than 30  $\mu\text{m}$  occupy more than 50 % of the sectional area therein. In this respect, it can be surmised that, at least, more than 88 % (for the highest value of either the broad range or the preferred range) or 93 % (for the optimum value) of particles exhibit a particle size greater than 50 microns. Consequently, it is positively asserted that particles greater than 50 microns represents a majority and therefore, they are the main component of the graphite powder and hence must be present in both the major axis and the minor axis directions by more than 50 %.*

As to the specific graphite density, it would have been obvious to a skilled artisan at the time the invention was made to use the graphite material having the specific density of Emanuelson et al to make the fuel cell separator composition of Saito et al because Emanuelson et al teach it has been found that graphite structures should have a high density to insure that the separator structure is impervious to hydrogen or other gases. Accordingly, an improved structure exhibiting a high strength is also obtained.

### ***Response to Arguments***

Applicant's arguments filed 03/15/04, with respect to claims 1-8 have been fully considered and are persuasive. In this respect, it is noted that the 35 USC 102 rejection of claims 1-8 has been rendered moot by the submission of the certified translation of the priority document. However, upon further reconsideration the present claims have been rejected over newly discovered art as seen above.

***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Raymond Alejandro whose telephone number is (571) 272-1282. The examiner can normally be reached on Monday-Thursday (8:00 am - 6:30 pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick J. Ryan can be reached on (571) 272-1292. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Raymond Alejandro  
Examiner  
Art Unit 1745

A handwritten signature in black ink, appearing to read 'RAM', with a long, sweeping horizontal stroke underneath.